In the Specification

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Also as shown, individual ~~transducers~~ transponders 62a, 62b and 62c may be located on single or individual products one to a shelf or one to an antenna location. It will be appreciated that it is often desirable to use transponders with limited range such as about one or two feet or even less to avoid them being read by many of the adjacent antennas. Even so, if a pair of antennas such as antennas 20b and 26b are selected to read as an interrogation pair, it will be appreciated that these two antennae will certainly read transponders 62b and 62c. Transponder 62b is almost directly in contact with antenna 20b and transponder 62c is almost in contact with antenna 26b. Likewise, if antenna pairs 14b and 20b are selected, the two antennas making up this pair will certainly read transponder 62a and 62b. Further, as mentioned, it may be desirable that the RFID transponder be selected or tuned to have a short enough reading range so they will not be read except by two or three of the closest antennas. However, this is not always possible and sometimes conditions will be such that a large number of surrounding antennas may read a single transponder. For example, in the embodiment shown, transponder 62b is indicated by radiation lines 64a – 64g as having sufficient transmission power to be read by at least nine separate antennas. Thus, it will be appreciated that if a single transponder or the package attached to which the transponder is attached is to be located by the control circuitry with respect to its vertical and horizontal position on a shelf, it can only be assumed that the transponder is located on one of the nine shelves. Consequently, there must be some protocol available for determining the location of the particular transponder in view of the multiplicity of reading. A suitable protocol or algorithm for determining this is discussed hereinafter.

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As we discussed above, it is desirable to have a protocol or algorithm whereby computer circuitry 56 can more precisely identify the location of each ~~transducer~~ transponder. Thus, referring now to Figure 2, there is shown a flow diagram suitable for

determining the location of a ~~transducer~~ transponder even if multiple antennas read the same transducer. As shown, there is a first step or block 70 wherein the various antenna pairs are identified and have their locations stored at known X (horizontal) and Z (vertical) locations. It is noted, as discussed above, for more complex systems, there could also be included a Y location storage. Then at step 72, each antenna pair is used to interrogate transponders within reading range and will list each unique transponder read by that antenna pair. As shown in step 74, the algorithm will then determine whether or not more than one transponder appears with respect to more than one pair of antennae. If the answer is NO, then the location both vertical and horizontal of the antennas which read the specific transponder, represents the closest location of the interrogated transponder, and the algorithm skips to step 88. However, as discussed, the answer will usually be YES, there is more than one pair of antennae or list upon which a transponder appears. Therefore, the program proceeds to step 76, which assigns the X and Y location values of the antenna reading the transponder. This is done for each listing of a specific transponder. Then as shown in step 78, the average X and Y values of all of the antennae reading a specific transponder are determined. The algorithm then progresses to step 80, wherein a determination is made as to whether or not the antenna which read the transponder is on the top shelf. If the answer is YES, the location of the average shelf location of the transponder is rounded down to the next lower shelf. However, if the answer is NO, the question is asked at step 84 whether or not the antenna is on a bottom shelf. In the case where the answer is YES, the location is rounded up to the shelf above the bottom shelf. However, if the answer is NO, then the program progresses to step 88 which determines if the average value is exactly between two integral values. If the answer to the determination of step 88 is NO, then the location of the read transponder is rounded up or down to the closest value as the location as shown at 90. On the other hand, if the answer is YES, then the location of the shelf is considered to be divided in a top half and a bottom half as indicated at step 92. The program then progresses to step 94 wherein there is a determination made as to whether or not the average location is in the top half of the divided shelf. If so, the value of the shelf is rounded up as the location as indicated at 96. Whereas, if the answer is NO, the shelf is rounded down to the lower location as indicated at 98.